USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY18 Performance Report
Due date: July 12, 2019

Cover Page

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Fiscal Year:	2018
USDA-ARS Agreement ID:	59-0206-8-189
USDA-ARS Agreement Title:	Managing Fusarium and DON for Soft Winter Wheat in Michigan.
FY18 USDA-ARS Award Amount:	$ 21,981
Recipient Organization:	Michigan State University Contract & Grant Administration Hannah Administration Building, Room 2 East Lansing, MI 48824-1046
DUNS Number:	193247145
EIN:	38-6005984
Recipient Identifying Number or Account Number:	RC108940
Project/Grant Reporting Period:	6/1/18 - 5/31/19
Reporting Period End Date:	05/31/19

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Managing Fusarium and DON for Soft Winter wheat in Michigan.	$ 21,981
	FY18 Total ARS Award Amount	$ 21,981

Martin Chilvers

July 10, 2019

Principal Investigator — Date

* MGMT – FHB Management
FST – Food Safety & Toxicology
GDER – Gene Discovery & Engineering Resistance
PBG – Pathogen Biology & Genetics
EC-HQ – Executive Committee-Headquarters
BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
HWW-CP – Hard Winter Wheat Coordinated Project
VDHR – Variety Development & Uniform Nurseries – Sub categories are below:
SPR – Spring Wheat Region
NWW – Northern Soft Winter Wheat Region
SWW – Southern Soft Red Winter Wheat Region

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Project 1: *Managing Fusarium and DON for Soft Winter wheat in Michigan.*

1. What are the major goals and objectives of the project?

This project was part of a multi-state effort to develop and validate integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in production fields.

Our objectives were to address the stated needs of the USWBSI: 1) assist in validating the integrated strategies using the next generation of wheat varieties; 2) evaluate the flexibility of fungicide application timing within the context of integrated management strategies; and 3) enhance forecasting capabilities for FHB and continued development of FHB and DON models for wheat.

2. What was accomplished under these goals? *Address items 1-4) below for each goal or objective.*

Goal: Develop and validate integrated management strategies for FHB and mycotoxins

1) major activities:
Field trials were established near Deckerville and East Lansing, MI. Both sites utilized varieties and from the soft white winter wheat subclass that possessed varying levels of susceptibility to FHB. The East Lansing site had five replicated treatments involving applications of Miravis Ace, Prosaro, Caramba, Proline and Folicur fungicides. Mist irrigation and inoculation employed to encourage disease development. The Deckerville site had eight replicated treatments using various fungicide products and application timings. At both locations, FHB incidence and severity was rated along with foliar disease levels. The trials will be mechanically harvested and subsamples taken for determination of levels of damaged kernels and DON.

2) specific objectives:
- to observed the response to late application due to a curative effect of Miravis Ace, Prosaro and Caramba;
- to observe infection rates for early-flowering and late flowering tillers to various fungicide applications;
- to determine if an anthesis fungicide application followed by a “late” application be more effective than single applications, and
- to evaluate the economic feasibility of a two-application fungicide program for FHB and DON management.

3) significant results and key outcomes:
Weather conditions were conducive to FHB at the East Lansing location. Data has been taken but not analyzes to date. In addition, the two locations provided observational sites and conditions that can support the FHB forecasting model. Significantly the studies

provide additional data on Miravis Ace, which includes an SDHI mode of action, not previously available for head scab management.

3. What opportunities for training and professional development has the project provided?

In conducting the trial, graduate students, research technicians, summer interns and the researchers themselves were afforded the opportunity to gain first-hand experience tools used to combat FHB. The trials also provided opportunities to discuss the disease and the project itself with wheat consultants and agribusiness personnel during field meetings. In additional, provided the opportunity for two individuals to participate in the Fusarium Forum and learn from researchers around the country who are also participating in the work.

4. How have the results been disseminated to communities of interest?

During the season, we featured this research trial during an annual wheat field meetings at the MSU research farm to discuss the issue and the purposes of the trials. Some 200 growers and agribusiness personnel attended.

The findings of this research were also disseminated to growers and agribusiness by way of:

- A fact sheet addressing FHB disseminated electronically and in hard copy;
- News articles;
- Presentations at MSU Extension grower meetings (Crop and Pest Management meetings)
- Individual consultations with growers and commercial applicators.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY18 award period. The term "support" below includes any level of benefit to the student, ranging from full stipend plus tuition to the situation where the student's stipend was paid from other funds, but who learned how to rate scab in a misted nursery paid for by the USWBSI, and anything in between.

1. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their MS degree during the FY18 award period?**
   No
   If yes, how many?

2. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY18 award period?**
   No
   If yes, how many?

3. **Have any post docs who worked for you during the FY18 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**
   No
   If yes, how many?

4. **Have any post docs who worked for you during the FY18 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**
   No
   If yes, how many?

Release of Germplasm/Cultivars

Instructions: In the table below, list all germplasm and/or cultivars released with full or partial support through the USWBSI during the FY18 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations.

NOTE: Leave blank if you have nothing to report or if your grant did NOT include any VDHR-related projects.

Name of Germplasm/Cultivar	**Grain Class**	**FHB Resistance** (S, MS, MR, R, where R represents your most resistant check)	**FHB Rating** (0-9)	**Year Released**

Add rows if needed.

NOTE: List the associated release notice or publication under the appropriate sub-section in the 'Publications' section of the FPR.

Abbreviations for Grain Classes

Barley - BAR
Durum - DUR
Hard Red Winter - HRW
Hard White Winter - HWW
Hard Red Spring - HRS
Soft Red Winter - SRW
Soft White Winter - SWW

Publications, Conference Papers, and Presentations

Instructions: Refer to the FY18-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY18 grant. Only include citations for publications submitted or presentations given during your award period (6/1/18 - 5/31/19). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

NOTE: Directly below each reference/citation, you must indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in publication/ presentation. See example below for a poster presentation with an abstract:

> Conley, E.J., and J.A. Anderson. 2018. Accuracy of Genome-Wide Prediction for Fusarium Head Blight Associated Traits in a Spring Wheat Breeding Program. In: Proceedings of the XXIV International Plant & Animal Genome Conference, San Diego, CA.
> Status: Abstract Published and Poster Presented
> Acknowledgement of Federal Support: YES (poster), NO (abstract)

Journal publications.

Books or other non-periodical, one-time publications.

Other publications, conference papers and presentations.

Presentations:
Wheat field day. East Lansing MI. Jun 12, 2019 200 participants
Status: Presented
Acknowledgement of Federal Support: YES

Wheat disease management. Frankenmuth, MI. Mar 20, 2019. 320 participants
Status: Presented
Acknowledgement of Federal Support: YES

Disease management in wheat. Syngenta Miravis Ace Launch Meeting. Mt Pleasant, MI Feb 7. 2019. 80 participants
Status: Presented
Acknowledgement of Federal Support: YES

Tar spot, ear molds, head scab. Nutrien Ag Solutions. Lansing, MI. Jan 22, 2019. 30 participants
Status: Presented
Acknowledgement of Federal Support: YES

Tar spot, ear molds, head scab, white mold and SDS. Wilbur-Ellis. Grant, MI. Jan 17, 2019. 22 participants
Status: Presented
Acknowledgement of Federal Support: YES

Disease decisions. Southwest Agricultural Conference Jan 3 & 4, 2019 260 participants
Acknowledgement of Federal Support: YES

Extension articles:

Using fungicides to suppress Fusarium head scab in wheat. Nagelkirk M. and Chilvers, M. MSUE News for Ag Jun 4, 2019

Conference presentations :

Breunig, M.K., **Chilvers, M.I.** 2018. Baseline senstivitiy of Fusarium graminearum from wheat, corn, soybean and dry bean to pydiflumetofen in Michigan. United States Wheat and Barley Head Scab Initiative. National Fusarium Head Blight Forum. St. Louis, MO. Dec 2-4, 2018.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (poster), NO (abstract)

Salgado, J.D., Bergstrom, G., Bradley, C., Bowen, K., Byamukama, E., Byrne, A., Collins, A., Cowger, C., Cummings, J., Chapara, V., **Chilvers, M.I.,** De Wolf, E., Dill-Macky, R., Darby, H.M., Esker, P.D., Friskop, A., Halvorson, J., Kleczewski, N., Madden, L.V., Marshall, J., Mehl, H., Nagelkirk, M., Starr, J., Stevens, J., Smith, D., Smith, M., Wegulo, S., Wise, K., Yabwalo, D., Young-Kelly, H.M., Paul, P.A. 2018. Efficacy of Miravis Ace for FHB and DON management across environments and grain market classes: A progress report. United States Wheat and Barley Head Scab Initiative. National Fusarium Head Blight Forum. St. Louis, MO. Dec 2-4, 2018.
Status: Abstract Published and Poster Presented
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